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不同盐分胁迫对野生大豆种子发芽的影响

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摘要: 一年生野生大豆是栽培大豆的野生近缘种和基因资源,具有耐盐碱、抗寒、抗病等优良性状。研究其种子萌发的耐盐性,为利用盐碱地资源和野大豆的引种驯化供依据。以山东德州一年生野大豆为材料,研究NaCl、Na₂SO₄、Na₂CO₃及三者的混合盐的胁迫对野大豆种子的发芽率、发芽势、发芽指数及胚生长的影响。随盐溶液浓度的增加,野大豆种子的发芽率、发芽指数均呈下降趋势,而低浓度的Na₂SO₄(10~50 mmolL⁻¹),Na₂CO₃(0~10 mmolL⁻¹)促进种子萌发,高浓度的NaCl(>200 mmolL⁻¹),Na₂SO₄(≥200 mmolL⁻¹),Na₂CO₃(≥75 mmolL⁻¹)抑制种子萌发;10 mmolL⁻¹Na₂SO₄处理下,其胚根胚轴长度都大于未经盐处理的,低浓度的盐分促进了胚根和胚轴的生长。结果表明低浓度的盐分促进一年生野生大豆胚的生长,野生大豆的胚根比胚轴对盐分更敏感。

Abstract: Wild soybeans (Glycine soja), the ancestors of cultivated soybean (Glycine max), are important sources of major genes for resistance to pests, diseases and environmental stresses. The study of salt stress on the seed germination is invaluable for efficient utilization of saline-alkali soil resources and wild soybeans. Wild soybean, collected from Dezhou, Shandong province, were treated with NaCl, Na₂SO₄, Na₂CO₃ and the mixture of three solutions. Seed germination percentage, viability, index and the growth of radicle and hypocotyl of annual wild soybean were measured and analyzed. Results showed seed germination percentage, germination viability, germination index and the growth of radicle and hypocotyl annual wild soybean reduced with increasing of salt concentrations of Na₂CO₃ and the mixture. Low concentrations of Na₂SO₄ (10-50 mmolL⁻¹), Na₂CO₃ (0-10 mmolL⁻¹) promoted germination of seeds, while high concentrations of NaCl (>200 mmolL⁻¹), Na₂SO₄ (≥200 mmolL⁻¹) and Na₂CO₃ (≥75 mmolL⁻¹) restrained it. Under low concentration of salt solution (10 mmolL⁻¹Na₂SO₄), the radicle length of Glycine soja was longer than that of the control (distilled water). Results suggest that lower concentration of salt solution simulated the growth of radicle and hypocotyl of wild soybean, and the radicle is more sensitive to salt stress than that of hypocotyl.

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